Final Project Summary

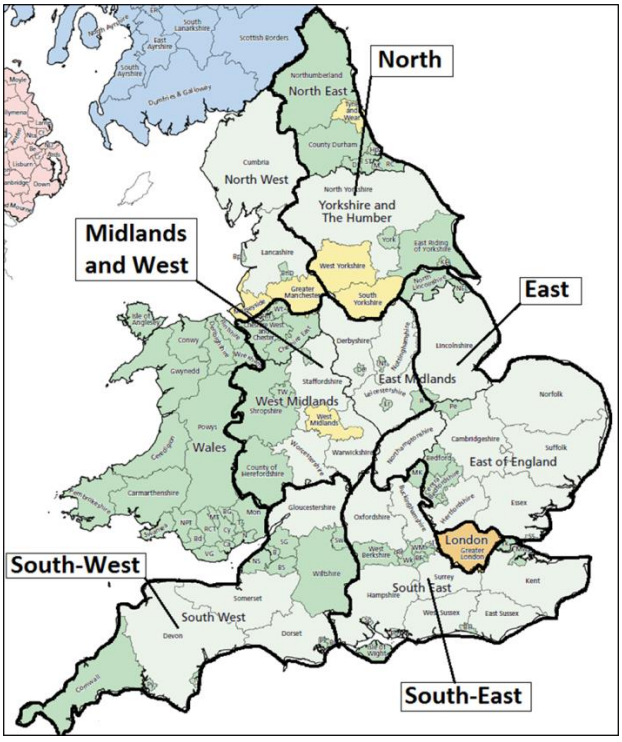
Project title	National Survey of Cabbage Stem Flea Beetle (CSFB) in Winter Oilseed Rape Plants in Autumn 2016 and Spring 2017		
Project number	21120056	**Final Project Report**	PR572
Start date	12th December 2016	**End date**	31st May 2017
AHDB Cereals & Oilseeds funding	£8,927	**Total cost**	£8,927

What was the challenge/demand for the work?

Cabbage Stem Flea Beetle (CSFB) (*Psylliodes chrysocephala*) populations have been much higher over the previous two years (2014-2015 and 2015-2016) than for at least 12 years preceding these. The reasons for this increase are not fully understood. The collection of survey data on the numbers of CSFB larvae in OSR plants in autumn and spring is essential in understanding the causes for CSFB population changes.

How did the project address this?

The assignment of counties to regions for these surveys is shown in Map 1.



Map 1. Assignment of geographical regions to counties for the 2017 survey. (Map courtesy of the Office for National Statistics.)

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Method:

- Eighty winter oilseed rape fields were selected at random from a list of farms in England derived from annual returns to Defra Census Branch. Winter oilseed rape crops were assessed for the presence of cabbage stem flea beetle. Plants from 79 fields were assessed in autumn and a subset of plants from 39 of the same fields was assessed in spring (one sample each from autumn and spring was not returned).
- Numbers of larvae were assessed by plant dissection: Every leaf on every plant was removed close to the stem, dissected, and the total number of larvae recorded. Twenty-five plants were assessed per field.

What outputs has the project delivered?

Results:

- The numbers of larvae found were lower in autumn 2016 compared with autumn 2015: in autumn 2016 we recorded 0.631 larvae per plant whereas there were, on average, 1.761 larvae per plant in autumn 2015.
- This pattern was observed across all regions and it was most notable in the 'East' and 'South West' (Table 1).
- The reduction in numbers was still evident for the 'East', 'North' and 'South East' regions in spring. Figures 1 and 2 show the numbers of larvae per plant by geographical region over time for the autumn and spring surveys.
- The numbers found in the spring survey were higher than in the previous spring for one region: 'South West' (Table 2).

Table 1. Average number of larvae per plant by region in autumn 2015 and 2016

	East	Midlands and West	North	South East	South West
2015 (larvae per plant)	3.26	0.86	1.57	1.58	1.54
2016 (larvae per plant)	0.65	0.35	0.81	1.11	0.25
Difference (larvae per plant)	2.61	0.51	0.76	0.47	1.29

Table 2. Average number of larvae per plant by region in spring 2016 and 2017

	East	Midlands and West	North	South East	South West
2016 (larvae per plant)	4.50	1.32	5.34	3.59	0.46
2017 (larvae per plant)	3.21	1.26	2.77	1.72	1.44
Difference (larvae per plant)	1.29	0.06	2.56	1.87	-0.98

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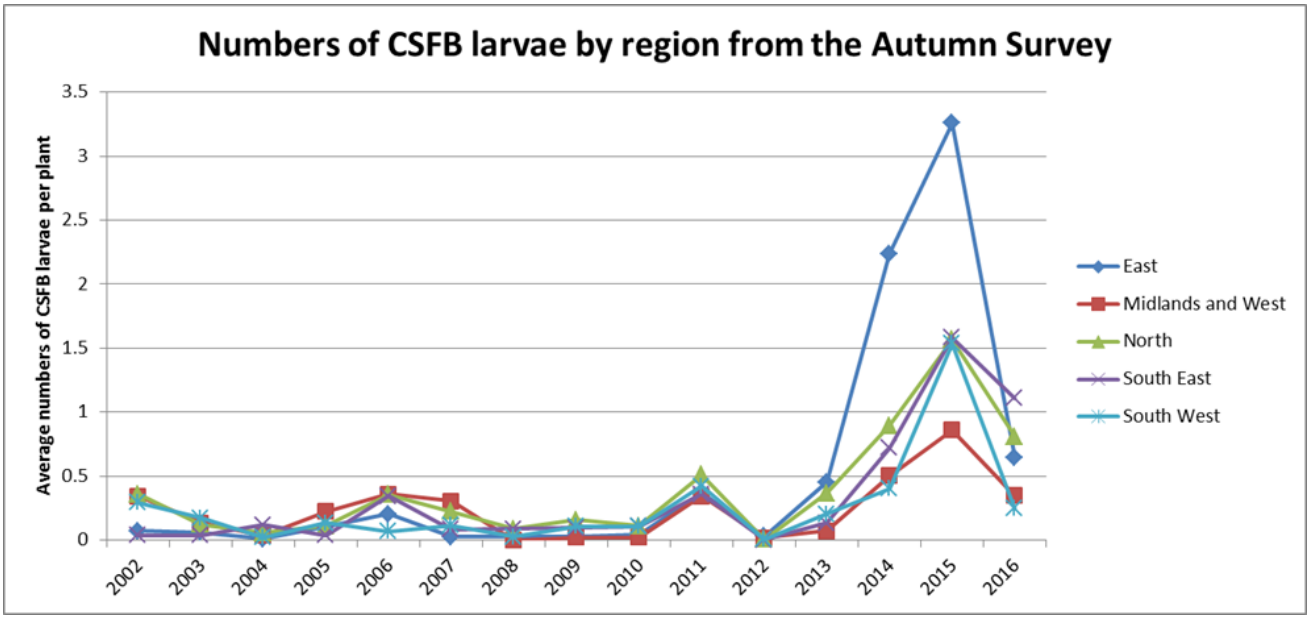

Figure 1. Mean number of CSFB larvae per plant by region – autumn survey

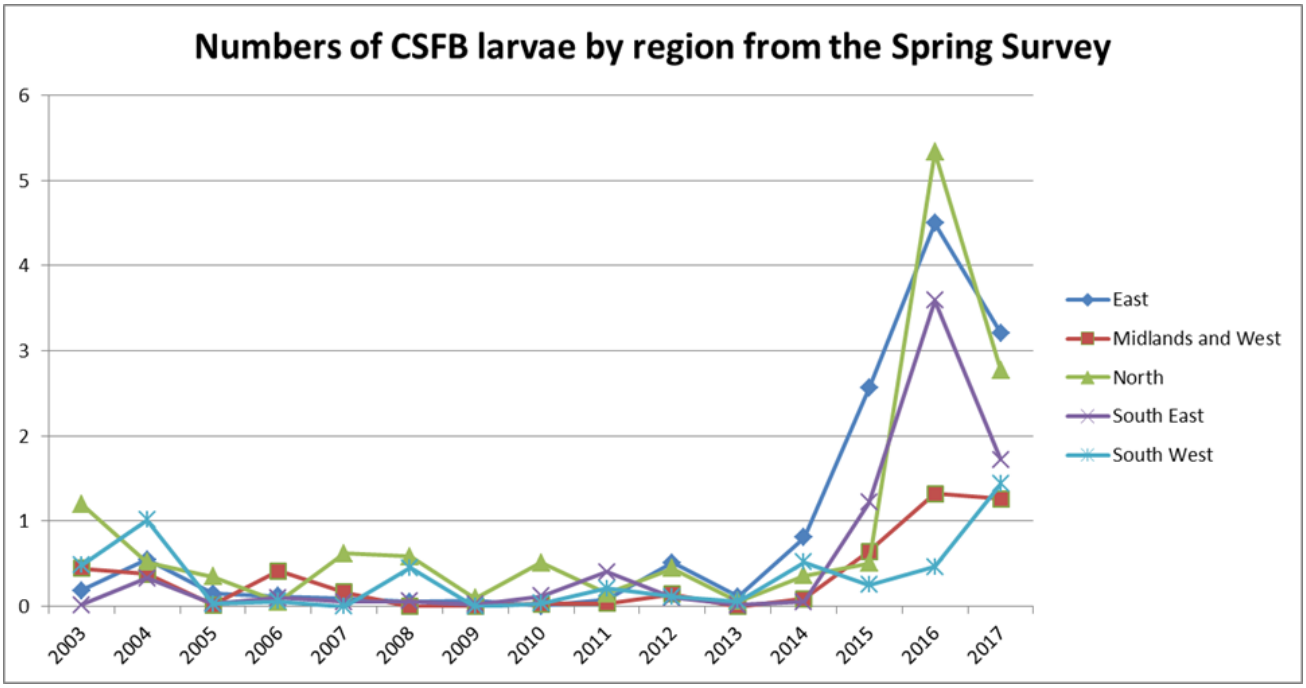

Figure 2. Mean number of CSFB larvae per plant by region – spring survey

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Threshold exceeded:

The threshold of five larvae per plant was exceeded at one site (in Kent in the South-East region) during the autumn 2016 survey. There were 10 sites in the South-East in total and 6 of these were in Kent. The threshold of five larvae per plant was exceeded at six sites during the spring 2017 survey. The six sites were in: Cambridgeshire (2 of 5 sites), Essex (1 of 2 sites), Lincolnshire (1 of 2 sites) and North Yorkshire (2 of 4 sites).

A possible explanation of why smaller numbers of larvae were initially detected in some regions in autumn 2016 than in previous years was due to a decrease in the adult beetle population: A lower population of adult beetles compared to 2015 was indicated by fewer yellow water trap catches in autumn 2016 (unpublished Fera Science Ltd. data). The winter weather was warmer than usual, according to the Met Office Temperature Anomaly Map, and this allowed the adult beetles to remain active throughout winter. Oviposition may have continued during winter and the conditions for survival of the larvae were better than in most previous winters in that the mean temperature was higher. This may explain the increase between the numbers of larvae found during the autumn 2016 and spring 2017 surveys in some regions. The implication for the OSR industry is that it is possible that even with small recorded numbers of adults and larvae in autumn that a larger population of CSFB larvae will be present in OSR plants in spring.

Who will benefit from this project and why?

This work provides levy payers with information on the changes in CSFB population by region and county compared with previous years. This database is also essential to future research projects and to the current related research project: 'Integrated pest management of cabbage stem flea beetle in oilseed rape' (AHDB reference 21120049).

If the challenge has not been specifically met, state why and how this could be overcome

Further work is required to ascertain the effects of mean temperature on population size and on changes in population size. This could be accomplished using a modelling approach which utilises the long-term data set. Future research should work to produce predictions of spring CSFB populations based on varying temperature anomalies during the winter months.

Lead partner	Dr Larissa Collins, Fera Science Ltd
Scientific partners	
Industry partners	Funding for sample collection was provided by CHAP
Government sponsor	Previous surveys, from which summary data has been presented and used in comparison, were funded by Defra.

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